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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/834,085 | 04/11/2001 | Yasuhiro Nishiyama | 9281-3943 | 2759 |

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| EXAMINER | |
|---|---|
| KLIMOWICZ, WILLIAM JOSEPH | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2652 | 20 |

DATE MAILED: 02/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/834,085 | NISHIYAMA ET AL. | |
| | Examiner | Art Unit | |
| | William J. Klimowicz | 2652 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *12 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-20 and 22-34* is/are pending in the application.

4a) Of the above claim(s) *6,7 and 13-20* is/are withdrawn from consideration.

5)☒ Claim(s) *29 and 30* is/are allowed.

6)☒ Claim(s) *1-5,8,22-24,27,28 and 31-34* is/are rejected.

7)☒ Claim(s) *9-12,25 and 26* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *16*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicants' submission filed on January 12, 2004 has been entered.

### *Claim Status*

Claims 1-20 and 22-34 are currently pending.

Claim 21 has been voluntarily cancelled by the Applicants.

Claims 6, 7 and 13-20 are withdrawn from consideration due to a Restriction Requirement made without traverse.

### *Drawings*

The corrected drawings were received on November 28, 2003 (Paper No. 13). These drawings are accepted by the Examiner.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it

pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 8, 22 and 31 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The percentage composition of nitrogen within the gap layer compound SiON which yields an amount of protrusion of the gap layer from a facing surface of a thin film magnetic head as being "less than or equal to about 3.5 nm" is critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

More concretely, the Applicants merely recite a composition of SiON (e.g., in claim 1, claim 8 and claim 31) and an amount of protrusion associated with the composition. The specification requires a certain percentage of nitrogen composition to arrive at such a minimal amount of protrusion as being less than 3.5 nm (as it pertains to a gap layer composition of SiON), as evidenced by not only the Applicants' specification (e.g., see, *inter alia*, page 15, line 30 through page 16, line 16) but also their remarks (see, e.g., Amendment D, Paper No. 19, page 13).

The Applicants' explicit admission at page 13, lines 14-16 of Amendment D, Paper No. 19, pertaining to a SiON composition gap layer, is important enough to be requoted, "[o]n the contrary, the ***projection distance limitation is a consequence*** of the material properties of SiON ***only within a narrow range of concentration of N***." Emphasis in bold italics and underlining added.

Alternatively, the Applicants' disclosure states that the gap layer may be conventional $SiO_2$, but to arrive at the disclosed minimal amount of claimed protrusion distance, this must be

achieved "under the condition that the Young's modulus E is more that about 123.2 (GPa)." See Applicants' disclosure, at, *inter alia*, page 6, lines 12-14.

Since this critical limitation is missing from the claim(s), the Applicants' claim scope exceeds that enablement of their disclosure by encompassing all materials that do not have a requisite amount of percentage nitrogen within their SiON composition (or alternatively, an $SiO_2$ film wherein the Young's modulus E is ***not*** more that about 123.2 (GPa). The instant specification is clearly only enabled for such a projection limitation provided that the nitrogen composition of SiON fall "within a narrow range concentration of N" as admitted by the Applicants, or wherein the conventional $SiO_2$ is provided "under the condition that the Young's modulus E is more that about 123.2 (GPa)."

Additionally, since claim 22 depends directly from claim 1, and fail to correct this deficiency, it is also rejected under the first paragraph of 35 U.S.C. § 112.

Claims 1-5, 22-24, 27-28 and 31-34 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

With regard to claim 1, lines 8-9, the phrase "a distance between the facing surface and a magnetic medium is between about 10 nm and about 3.5 nm" has no support in the original disclosure, including the drawings.

Additionally, since claims 2-5, 22, 33 and 34 depend directly or indirectly from claim 1, they too are thus rejected under this section of the first paragraph of 35 U.S.C. § 112.

With regard to claim 23, lines 5-7, and similarly claim 27 (lines 6-8), the phrase "wherein the gap layer contains at least silicon and oxygen and has a Young's modulus being at least about five percent greater than that of a $Ta_2O_5$ film" has no support in the original disclosure, including the drawings.

While the original disclosure does support wherein a gap layer contains at least silicon and oxygen and has a Young's modulus being at least about ten percent greater than that of a $Ta_2O_5$, (since the disclosure of at least about GPa of 123.2, relative to a $Ta_2O_5$ of 113.9, yields a difference of at least about 8.7 percent or greater), there is no support for the lower range of "five percent." (e.g., see page 16, lines 21-30 of Applicants' disclosure).

Additionally, since claim 24 depends directly from claim 23 and fails to correct this deficiency, it too is thus rejected under this section of the first paragraph of 35 U.S.C. § 112.

With regard to newly presented claim 31, the recitation "wherein the gap layer comprises a SiON film, the Young's modulus of said SiON film ***being high enough*** such that an amount of protrusion of the gap layer from the facing surface is at most about 3.5 nm" (emphasis added) may have some support, but expands beyond the initial limited range set forth in the specification to now encompass ranges outside of that originally disclosed. This is evidenced by its dependent claim 32, which sets forth a range that is beyond that supported by the original disclosure (Note that dependent claims must further limit their preceding claims, and thus even claim 32, which depends from claim 31, is outside the original disclosed ranges).

Dependent claim 32 also contains this expanded and unsupported limitation and is thus also rejected under this section of the first paragraph of 35 U.S.C. § 112.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 8 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Chang et al. (US 5,719,730).

As per claim 1, Chang et al. (US 5,719,730) discloses a thin film magnetic head (FIGS. 1-5) comprising: an insulating gap layer (e.g., 18) provided between cores (16, 18) made of a magnetic material; and a coil for inducing a recording magnetic field in the cores (16, 18) (e.g., see COL. 6, lines 10-21), wherein the cores have a facing surface, wherein the amount of protrusion of the insulating gap layer from the facing surface is less than or equal to about 3.5 nm (or less than or equal to about 3 nm as per claims 21 and 22). This range limitation is based on the material of the gap layer (18), which is disclosed as silicon oxynitride (SiON). The gap layer (18) comprises a SiON film (e.g., see COL. 5, lines 22-30 in conjunction with COL. 6, lines 52-59) and the fact that Chang et al. (US 5,719,730) discloses no protrusion whatsoever as it pertains to this layer, relative to the ABS of the slider. Note that the limitation pertaining to the distance between the acing surface and a magnetic medium as being "between about 10 nm and 3.5 nm" is looked upon as a limitation of slider capability when used in a disk drive, since claim 1 is drawn to a slider *per se*, and not a slider/disk apparatus or combination.

Moreover, as is known in the art, the slider air bearing surfaces are lapped to achieve planarity with their thin film magnetic heads. Moreover still, Chang et al. (US 5,719,730) does not in any way disclose any protrusion of the gap layer from the air bearing surface. It appears that the Applicants are ***inherently*** assuming some type of protrusion for the gap layer film of SiON. It is unclear as to what evidence the Applicants may have in their possession pertaining to the amount of protrusion of the SiON layer film of Chang et al. (US 5,719,730), given that Chang et al. (US 5,719,730) discloses no protrusion whatsoever. As noted by the Applicants, at page 14 of Paper No. 19:

> Under principles of inherency, when a reference is silent about an asserted inherent characteristic, it must be clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991). "Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." (*In re Oelrich*, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981).

Clearly, the Applicants assumption that the gap layer of SiON of Chang et al. (US 5,719,730) might *possibly* project from the air bearing surface, contrary to the disclosure of Chang et al. (US 5,719,730), fails to satisfy the principles of inherency as defined by the CAFC and their predecessor, the CCPA.

Moreover, as noted most recently, a U.S. Court of Appeals for the Federal Circuit decision held Jan. 20 (*Toro Co. v. Deere & Co.*, Fed. Cir., No. 03-1160, 1/20/04) "the fact that a characteristic is a necessary feature or result of a prior-art embodiment (that is itself sufficiently described and enabled) is enough for inherent anticipation, even if that fact was unknown at the time of the prior invention."

As per claim 8, Chang et al. (US 5,719,730) further discloses a magnetoresistive element (12) capable of detecting a recording signal due to a change in electric resistance with an external magnetic field; and shield layers (10, 16) formed above and below the magnetoresistive element (12) with gap layers provided therebetween (lower gap layer of (14) is formed prior to deposition of MR sensor (12) and upper gap layer of (14) is deposited over the MR sensor after formation of the MR sensor), wherein at least one of the gap layers (14) comprises a SiON film. The amount of protrusion of the insulating gap layer from the facing surface is less than or equal to about 3.5 nm. See the discussion as it pertains to claim 1, and as further discussed in detail in the Response section, *infra*. The material of the gap layer (18) is disclosed as silicon oxynitride (SiON). See COL. 5, lines 11-30.

Claim 23 is rejected under 35 U.S.C. 102(b) as being anticipated by Applicants' admitted prior art (See Applicants' disclosure, page 16, lines 26-30 in conjunction with page 1, line 15 through page 4, line 2 and FIG. 11).

As per claim 23, Applicants' admitted prior art discloses a thin film magnetic head (e.g., FIG. 11) comprising: a gap layer (e.g., 9) provided between cores (3, 8) made of a magnetic material; and a coil (6) for inducing a recording magnetic field in the cores (3, 8), wherein the gap layer (e.g., 9) contains at least silicon and oxygen and has a Young's modulus being at least about five percent greater than that of a $Ta_2O_5$ film. Note that $Ta_2O_5$ film has a GPa of about 113.9, and SiO2 has a GPa of "about 123.2" (which includes a GPa slightly above 123.2. this results in a range of up to about 8.7 percent. See *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990) (The prior art taught carbon monoxide concentrations of "about 1-5%"

while the claim was limited to "more than 5%." The court held that "about 1-5%" allowed for concentrations slightly above 5% thus the ranges overlapped.) See Applicants' disclosure, page 16, lines 26-30 in conjunction with page 1, line 15 through page 4, line 2.

***Response to Arguments***

Applicants' arguments filed January 12, 2004 (Paper No. 19) have been fully considered.

The Applicants allege that Chang et al. (US 5,719,730) fails to inherently disclose the amount of protrusion as being less than the claimed range. More concretely, it appears that the Applicants are alleging that Chang et al. (US 5,719,730) must inherently disclose some amount of protrusion, although the Examiner can find no support for such a possibility of "inherent" protrusion. As set forth in the rejection, *supra*, as is known in the art, the slider air bearing surfaces are lapped to achieve planarity with their thin film magnetic heads. Moreover still, Chang et al. (US 5,719,730) ***does not in any way disclose <u>any</u> protrusion*** of the gap layer from the air bearing surface. It appears that the Applicants are ***inherently*** assuming some type of protrusion for the gap layer film of SiON. It is unclear as to what evidence the Applicants may have in their possession pertaining to the amount of protrusion of the SiON layer film of Chang et al. (US 5,719,730), given that Chang et al. (US 5,719,730) discloses no protrusion whatsoever and is made of a SiON material. As noted by the Applicants, at page 14 of Paper No. 19:

> Under principles of inherency, when a reference is silent about an asserted inherent characteristic, it must be clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991). "Inherency, however, may not be established by probabilities or possibilities. The mere fact

that a certain thing may result from a given set of circumstances is not sufficient." (*In re Oelrich*, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981).

Clearly, the Applicants assumption that the gap layer of SiON of Chang et al. (US 5,719,730) might *possibly* project from the air bearing surface, contrary to the disclosure of Chang et al. (US 5,719,730), fails to satisfy the principles of inherency as defined by the CAFC and their predecessor, the CCPA.

Moreover, as noted most recently, a U.S. Court of Appeals for the Federal Circuit decision held Jan. 20 (*Toro Co. v. Deere & Co.*, Fed. Cir., No. 03-1160, 1/20/04) "the fact that a characteristic is a necessary feature or result of a prior-art embodiment (that is itself sufficiently described and enabled) is enough for inherent anticipation, even if that fact was unknown at the time of the prior invention."

The Applicants have failed to provide any affidavit, or convincing line of scientific reasoning, that would distinguish the claimed insulating gap material formed of silicon oxynitride (SiON), which based on its composition, results in a protrusion of less than 3.5 nm, from Chang et al. (US 5,719,730), who discloses the ***identically claimed silicon oxynitride*** (SiON). There is nothing in the claimed invention that differentiates the instantly claimed composition of Applicants from Chang et al. (US 5,719,730), at least as set forth in claims 1 and 8.

***Allowable Subject Matter***

Claims 9-12, 25 and 26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 29 and 30 are allowed.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William J. Klimowicz whose telephone number is (703) 305-3452. The examiner can normally be reached on Monday-Thursday (6:30AM-5:00PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

William J. Klimowicz
Primary Examiner
Art Unit 2652

WJK